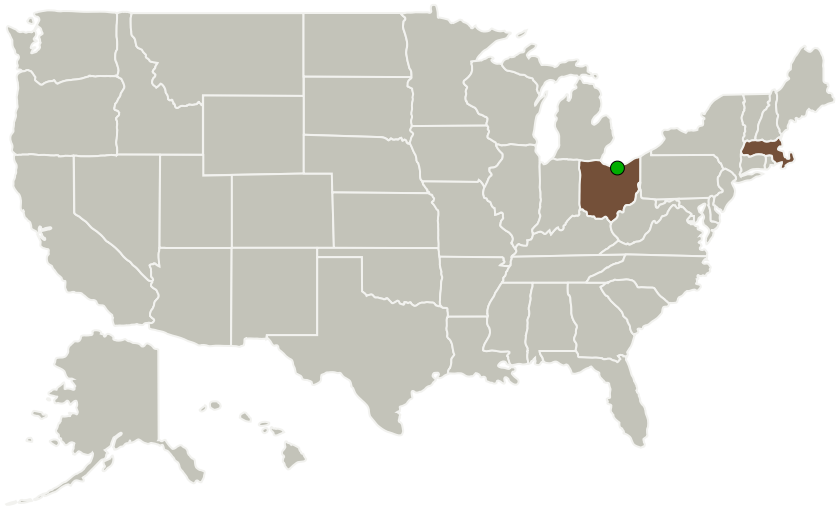
Dwell Mechanism for Increasing Free-Piston Stirling Engine Specific Power and Efficiency, Phase I

Completed Technology Project (2015 - 2015)

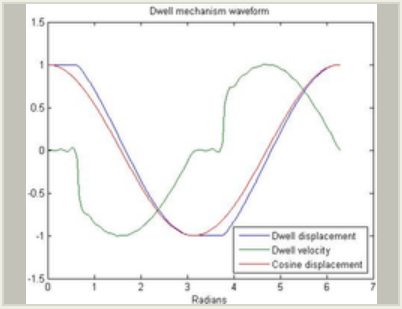
Project Introduction

Proposed is a displacement dwell mechanism for increasing Stirling engine power output and efficiency. The dwell mechanism allows for deviations from a sinusoidal displacement profile found in crank-driven Stirling engines. Longer dwell allows slightly more time for heat transfer to occur in both the hot- and cold-side heat exchangers. Preliminary simulations using freely available Stirling engine simulation code by Israel Urieli indicates that even a modest increase in dwell time increases power output and efficiency. Increasing the power output and efficiency of a Stirling engine by way of a simple mechanical device represents the ?low hanging fruit? compared to complex and expensive regenerator/heat exchanger optimization and development.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Aerodyne Research, Inc	Lead Organization	Industry	Billerica, Massachusetts
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



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Primary U.S. Work Locations	
Massachusetts	Ohio

Project Transitions

June 2015: Project Start

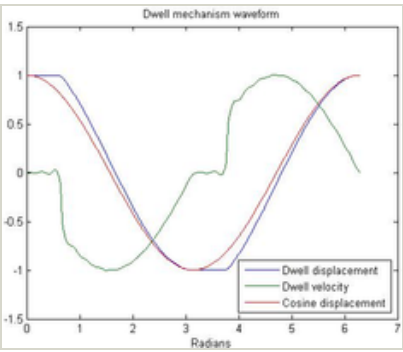
December 2015: Closed out

Closeout Summary: Dwell Mechanism for Increasing Free-Piston Stirling Engin e Specific Power and Efficiency, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138951)*

Images



Briefing Chart Image
Dwell Mechanism for Increasing Free-Piston Stirling Engine Specific Power and Efficiency, Phase I *(https://techport.nasa.gov/image/136607)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Aerodyne Research, Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

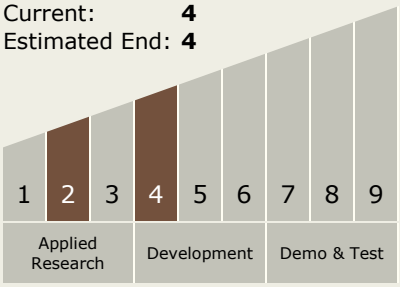
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Richard Jorgenson

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2015 - 2015)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.2 Heat Sources

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System